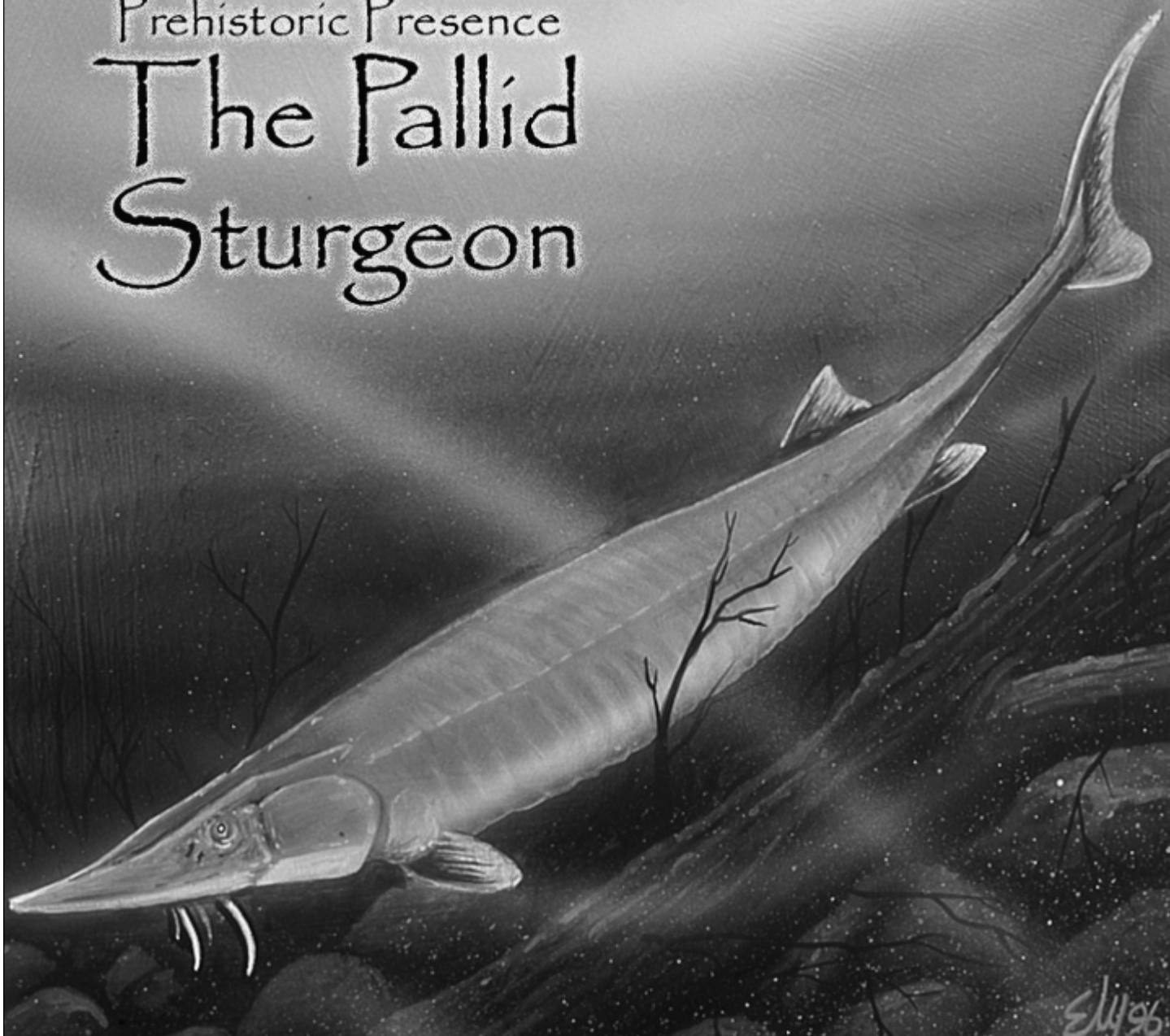


Prehistoric Presence The Pallid Sturgeon

Dave Ely



By Rob Holm
Photos by Harold Umber

One of North Dakota's most fascinating creatures is relatively unknown and is seldom seen in its natural habitat. This cold blooded animal evolved during the reign of the dinosaurs more than 200 million years ago when its ancestors were the dominant freshwater fish.

The pallid sturgeon, North Dakota's prehistoric native, survived the ice age and is one of the oldest living fossils in the state. Evolution was not kind to this creature. Ugly may be only skin deep, but this fish has thick skin. Visualize a five-foot-long 80-pound fish with a vacuum like mouth, beady eyes, whiskers, and a body covered with scutes, a scale-like structure that gives the appearance of a coat of armor. The head is spade-shaped and flattened, it has a broad middle, and an elongated bony tail.

So why the sudden interest in this fish? It's an endangered species.

What caused the sudden demise?

Habitat changes over the past half century have isolated sturgeon populations worldwide and have caused a rapid fall of the species. The main culprit has been construction of dams. A dam by itself may not limit the fish's existence. What is limiting pallid sturgeon is operations of dams that don't take into account the fish's habitat requirements.

Water releases from Missouri River reservoirs are currently regulated to optimize barge travel and hydropower production with complete disregard to the flows necessary to sustain the fish's life cycle. Channelization and dredging further disrupted sturgeon habitat, putting them on the brink of extinction. This fish outlived the dinosaurs but can't compete in this harsh new world.

The Endangered Species Act of 1973 may be the only hope these fish have for continued existence. The act requires federal agencies to ensure their actions are not likely to jeopardize the continued existence or modify the habitat of a listed species. Current operation of our dams are jeopardizing the existence of the pallid sturgeon.

In the late 1980s fishery biologists realized that the pallid sturgeon was in trouble. On September 6, 1990 the fish was listed as an endangered species and a recovery plan was initiated.

With the help of state and federal conservation agencies from Louisiana to Montana, research was gathered on the life history of this prehistoric animal. Recovery objectives included capturing wild fish for egg collection, rearing of sturgeon at hatcheries for stocking, and restoration of water flows and habitat necessary for the sturgeon to exist.

The population of pallid sturgeon in the Missouri and Yellowstone rivers from Gavins Point Dam in southeastern South Dakota through its northern-most range above Fort Peck Reservoir in Montana consists of about 650 fish. We have learned much about the life history of the fish over the past couple decades, but much remains a mystery.

We know that the pallid sturgeon is long lived – probably near 60 years. The fish has no bones or scales, consequently determining its age with precision is difficult. We know its anatomy is different from modern fishes. Egg development in a female sturgeon takes at least two years. Spawning success is determined by environmental cues, if conditions are not right the fish will not deposit her eggs. We have

no documentation of successful natural spawning in many decades.

Fortunately we have captured a few fish in the wild each year in breeding condition, and have developed a spawning technique using hormone injections and catheterization that

has been successful in creating young sturgeon. With the aid of research biologists from Georgia we were successful in freezing sperm. The frozen

sperm can be stored in liquid nitrogen for many years, awaiting a time it's needed to fertilize a new batch of eggs, perhaps preserving the genetic makeup of the pallid sturgeon population. We have successfully used frozen sperm to create young pallid sturgeon, and most importantly, we have released young pallid sturgeon back to the river where they have been captured by fishermen and fish biologists after spending a few years there. The young pallids appear to be adapting well to their new homes.

So what is the problem?

Conditions in the river have not changed and the few remaining fish are reaching old age. No successful spawning in the wild has been documented. Although some changes to the operations of the Missouri River dams may be forthcoming (as part of the Master Manual review), it will take time for any hope that the pallid population can become self-sustaining.

In the meantime, with the help of many state and private partnerships, the U. S. Fish and Wildlife Service has successfully propagated pallid sturgeon. Initial reintroduction of hatchery-reared fish took place in 1998, with the release of 1,885 year-old fish from two females and four males. In the next two years we added 776 fish. The recovery effort is moving slowly, but it is moving ahead.

Of the 300 pallid sturgeon captured over the past decade, all have been larger and presumably older fish. For the few fish that have had their age calculated, the age coincides with a hatch date in the early 1950s. Closure of Garrison Dam occurred in April, 1953. Changes in water flows in the Missouri River followed. The more fish we lose to old age, the fewer we can collect for spawning at the hatchery and the greater the risk of stocked fish becoming inbred. It is critical that we answer the question of why these fish are choosing not to spawn, or if they are spawning, why aren't any young fish surviving?

A major roadblock came in December 1998. An unknown virus was identified in sturgeon at Gavins Point National Fish Hatchery in South Dakota. Stocking of fish exposed to the virus was prohibited. There were concerns as to the overall

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effect of the virus on the survival of the fish and where the virus had originated. The following year the virus was also found in pallid sturgeon at the two North Dakota hatcheries.

In spring of 2001 the USFWS made the decision to destroy all pallid sturgeon held at Garrison Dam National Fish Hatchery and disinfect the tanks and building. The Western Area Power Administration purchased and installed a disinfection system on the water line serving the sturgeon building. Ultraviolet light produced by the system was used to destroy harmful organisms similar to those used in many city water treatment facilities. So far the system appears to be working as designed.

This past year we increased our research efforts into the virus history. Spawning of collected wild fish was accomplished at a remote site on the river upstream from Fort Peck Reservoir and at the Miles City State Fish Hatchery in Montana. The sites were selected so as not to expose the fish to the hatcheries where the virus was found. Tissue samples collected in the wild were sent off to fish disease specialists in California and Montana. In the meantime, spawning was a success at both sites. Young pallids were produced from three female and nine male sturgeon collected. Currently several thousand fish are being reared at three hatcheries, Garrison Dam in North Dakota, the Fish Technology Center in Bozeman, and Miles City State Fish Hatchery. To date the fish at all three hatcheries are virus-free.

In December, the Center for Aquatic Biology and Aquaculture located on the University of California, Davis campus reported that the virus identified on hatchery-reared sturgeon was also found in wild-caught sturgeon in the Missouri River. The findings came after several years of research on a similar virus affecting the West Coast's white sturgeon, and two years after its initial discovery at the hatchery. A newly developed technique using molecular DNA analysis was the key to isolating the virus in the wild.

Further studies at the hatcheries have shown that although the virus may be associated with some fish mortality, it is likely not the sole cause and is not a reason for grave concern. The virus was likened to many childhood viruses in humans. The virus affected only very young fish, and once the disease had run its course, would go into a latent stage similar to chickenpox, where it would become difficult to detect in the adults. Since no young pallid sturgeon existed in the wild, we were unable observe the symptoms of the virus there. The virus particles had to be detected on adult fish where they occurred only at low levels.

With this news, the quarantine status of the hatcheries will likely be lifted and we will be able to resume the stocking of certified healthy sturgeon. Plans are to stock the fish at selected sites from Missouri to Montana this spring and summer. Recovery efforts this spring also include the collection and spawning of adult pallids at Garrison Dam National Fish Hatchery. The adults are captured in the wild and held in large circular tanks at the hatchery prior to spawning in June. Visitors to the hatchery are encouraged to glimpse this rare prehistoric creature. With the continued support of our partners and the general public, we hope to one day recover this living dinosaur.

ROB HOLM is manager of the Garrison Dam National Fish Hatchery.



Large Missouri River dams, like Garrison, created huge reservoirs and changed the nature of water flows in the remaining segments of river. One of the native fish affected was the pallid sturgeon. Biologists have been studying various aspects of this altered river system in order to better understand the problems faced by not only pallid sturgeon, but other native species as well.

Inset: Rob Holm, fish hatchery manager, with one of 10,000 young pallids currently in residence at Garrison Dam National Fish Hatchery near Riverdale.

